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SUBJECT Specification Sheets on Soviet Optical
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SUPPLEMENT TO
REPORT NO.

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The following specification sheets in English on Soviet optical and precision instruments, [REDACTED] are being sent to you for retention in the belief that they may be of interest. The specification sheets were issued by Stankoimport, Moscow, and published by Mezhdunarodnaya Kniga.

- a. Alidade with Plane Table Model KV
- b. Biological Microscope M-9
- c. Capillarscope Model M 70A
- d. Contour Measuring Projector Model BP
- e. Double Spectrum Projector Model DSP-1
- f. Direct-Reading Hardness Testing Machine (Rockwell Principle) Model RV
- g. Horizontal Comparator Model IZA-2
- h. Horizontal Optical Comparator Model IKG
- i. Large Toolmakers' Microscope Model BMI
- j. Microscope for Measuring Spectrograms Model MIR-12
- k. Non-Recording Photoelectric Microphotometer Model MF-2
- l. Optical Dividing Head Model ODG
- m. Optical Flats for Testing Micrometers Model PM
- n. Optical Theodolite Model OT-10
- o. Pilot Balloon Theodolite Model ShT
- p. Portable Steeloscope Model SLP-1
- q. Quartz Spectrograph Model ISP-22
- r. Simplified Polarizing Microscope Model MIN-2
- s. Slit Lamp Model ShchL
- t. Spectrum Projector Model PS-18
- u. Steeloscope Model SL-3
- v. Theodolite Tacheometer Model TT-2
- w. Three-Prism Glass Spectrograph Model ISP-51
- x. Toolmakers' Microscope Model IT
- y. Triangulation Theodolite Model TT2/6
- z. Universal Measuring Microscope Model UIM-21
- aa. Universal Monochromator Model UM-1
- bb. Vertical Comparator Model IZV-1
- cc. Vertical Optical Comparator Model IKV

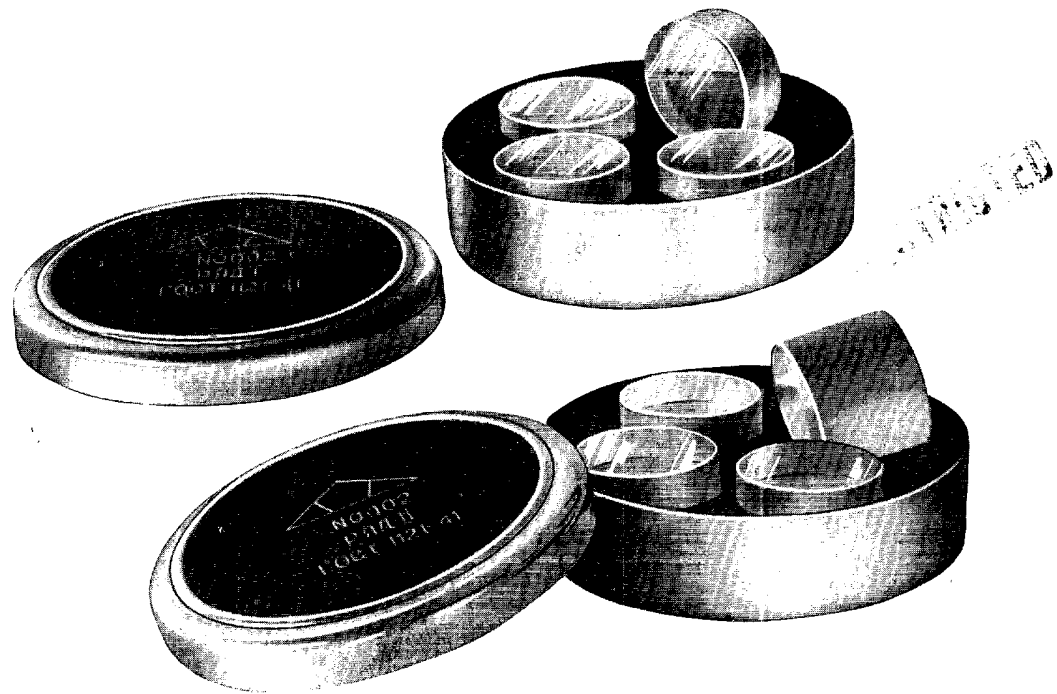
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CPYRGHT

OPTICAL FLATS FOR TESTING MICROMETERS

MODEL PM



The Parallel-sided Optical Flats Model ПМ provide a very convenient method of checking the flatness and parallelism of measuring faces on micrometers and other measuring apparatus.

The Optical Flats comprise plates of glass with both faces optically worked and polished to an extremely high degree of accuracy. The error in parallelism between the two working surfaces of the flat is within 0,5 microns, and the error in flatness is 0.1 micron.

When the flat face is placed in contact with a nominally flat lapped or polished surface, coloured interference bands can be seen. These are due to the interference of light between the optical flat and the test surface. The spacing of the bands forms the standard of measurement and successive bands represent differences of separation of the two surfaces of half a wavelength, i. e. almost exactly — 0.0003 mm.

By closing the micrometer measuring faces on the flat and manipulating so that one face shows no bands or only rings, the sum of the number of bands or rings on the two faces indicates the error in parallelism in units of 0.3 microns.

Lack of squareness of both faces to the axis of the micrometer screw will introduce variations in parallelism as the thimble is rotated. It is therefore, necessary to check with several flats of different thicknesses. The PJM set of micrometer flats comprises four flats, and their thicknesses are arranged to test at four 90° positions of rotation.

The ПМ optical Flats are furnished in three nominal thicknesses designated as ПМ-12, ПМ-25, ПМ-50 and in six sets.

The set of optical flats comes complete in a felt-lined case.

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CLASS: PS 00 5P 10 00500213

ПМ OPTICAL FLATS

Flat thickness mm	ИМ-12				ИМ-25				ИМ-50			
Set number												
I	12.00	12.12	12.25	12.37	25.00	25.12	25.25	25.37	50.00	50.12	50.25	50.37
II	12.12	12.25	12.37	12.50	25.12	25.25	25.37	25.50	50.12	50.25	50.37	50.50
III	12.25	12.37	12.50	12.62	25.25	25.37	25.50	25.62	50.25	50.37	50.50	50.62
IV	12.37	12.50	12.62	12.75	25.37	25.50	25.62	25.75	50.37	50.50	50.62	50.75
V	12.50	12.62	12.75	12.87	25.50	25.62	25.75	25.87	50.50	50.62	50.75	50.87
VI	12.62	12.75	12.87	13.00	25.62	25.75	25.87	26.00	50.62	50.75	50.87	51.00

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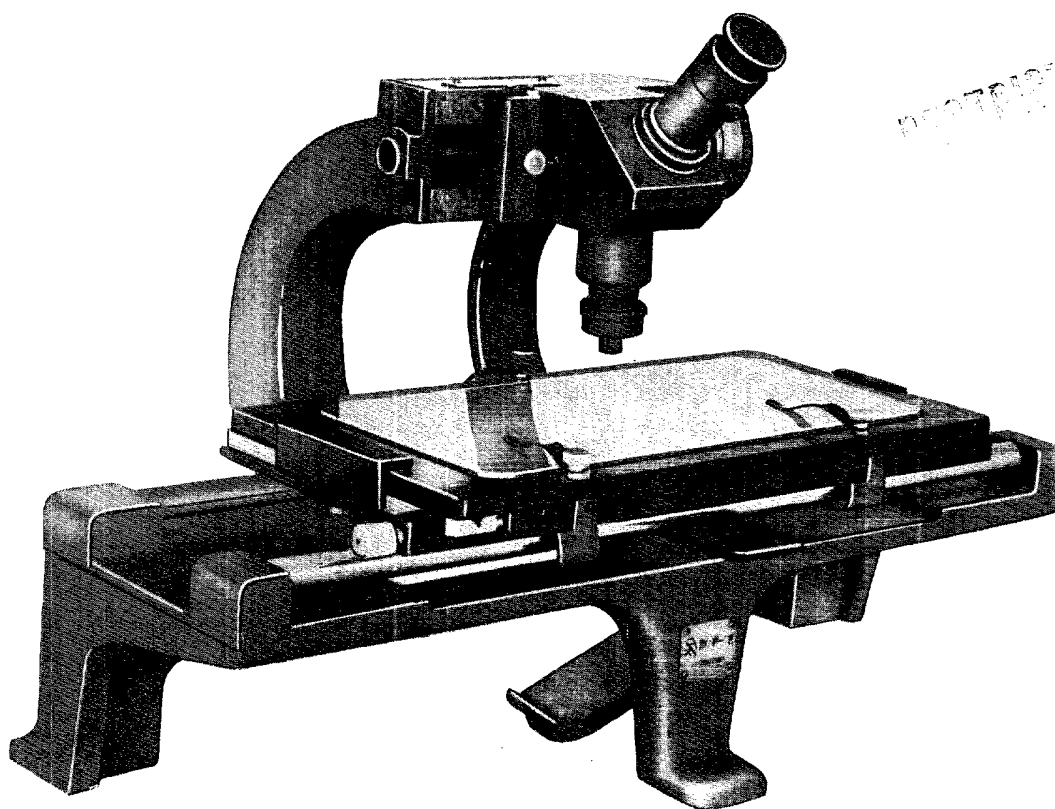
Detailed catalogues and pamphlets sent on request.

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ul. Kuibysheva, 21, Moscow, USSR. For cables: Stankoimport, Moscow.

MICROSCOPE FOR MEASURING SPECTOGRAMS MODEL **МНР-12**



The model **МНР-12** microscope is an instrument especially adapted to the measurement of spectrograms.

It may also be used for many other measuring purposes.

SPECIFICATIONS

Accuracy of measurement, mm.	0.01
Range of measurements, in longitudinal direction only, mm.	from 0 to 50
Magnification of microscope	15x
Field of view, mm.	5
Magnification of objective	3x
Numerical Aperture of objective	0.1
Resolving power of objective, mm.	0.003

ACCESSORIES

Object glass plate

Set of accessories

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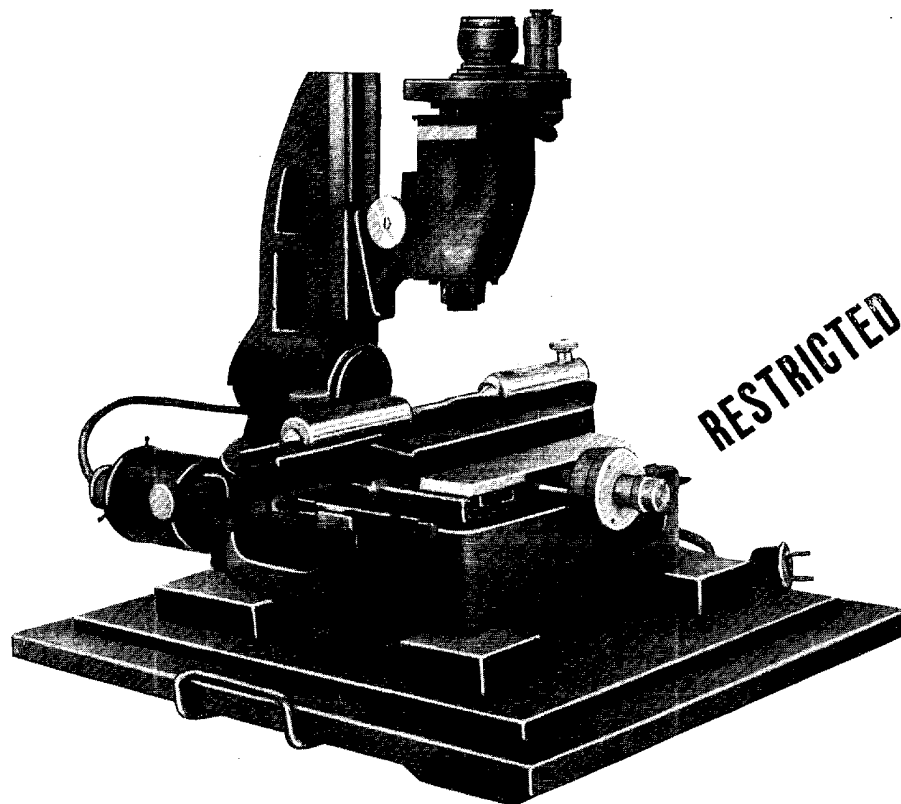
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TOOLMAKERS' MICROSCOPE MODEL M1

25X1A



The M1 Toolmakers' Microscope is an accurate universal and rugged instrument designed for optical measuring and inspecting various angles or thread forms, tools, jigs, dies, templets and many other objects.

The Microscope is widely used by the machinist and toolmaker. Without sacrificing anything in accuracy it is adapted to the needs of the workshop as well as the mechanical laboratory.

The Microscope unit is focused by rack and pinion after rough adjustment on the ways of the support column. This column can be tilted through 12° each side of vertical by two screws. The Microscope eyepiece has a magnification of 9.1 x. In the reticle of the eyepiece are two crosslines, the angle between which may be varied. The reticle and the protractor circle are rotated simultaneously. By setting one of the crosshairs successively on the two sides of any angle and taking the difference of the two readings of the protractor circle the angle is accurately measured. The protractor circle scale is graduated to one degree and is observed through a separate microscope, which contains a reticle having 60 lines to embrace 1° on the scale, thus the protractor scale is 1 division = 1 minute.

The cross slide stage of the Toolmakers' Microscope has a range of 25 mm in either direction in the horizontal plane. The insertion of gauge blocks increases the longitudinal range to 75 mm. The stage rests on ball bearings, which assure a straight and almost frictionless motion controlled by two micrometer screws.



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SPECIFICATIONS

Total magnification	27.3x
Magnification of objective	3x
Magnification of eyepiece	9.1x
Field of view, mm	6
Source of illumination	bulb, 25—40 w, 120—220 v.
Illumination control	by iris diaphragm
Protractor microscope	42x
Reading accuracy of protractor circle to, minutes	1
Range of microscope column tilt	$\pm 12^\circ$
Stage travel in longitudinal and cross directions by micrometer screws, mm	25
Increased travel of stage in longitudinal direction by means of gauge blocks, mm	75
Accuracy of measurement of thread diameters, mm	0.005
Accuracy of angular measurements, minutes	2
Overall dimensions, mm	450x475x340

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ACCESSORIES

Protractor unit	Clamp for small diameter objects
Centers and centers' support	Object clamp and supports
V-block for holding centreless parts	Block gauges, 25 mm and 50 mm
Stage arbor	Carrying case.

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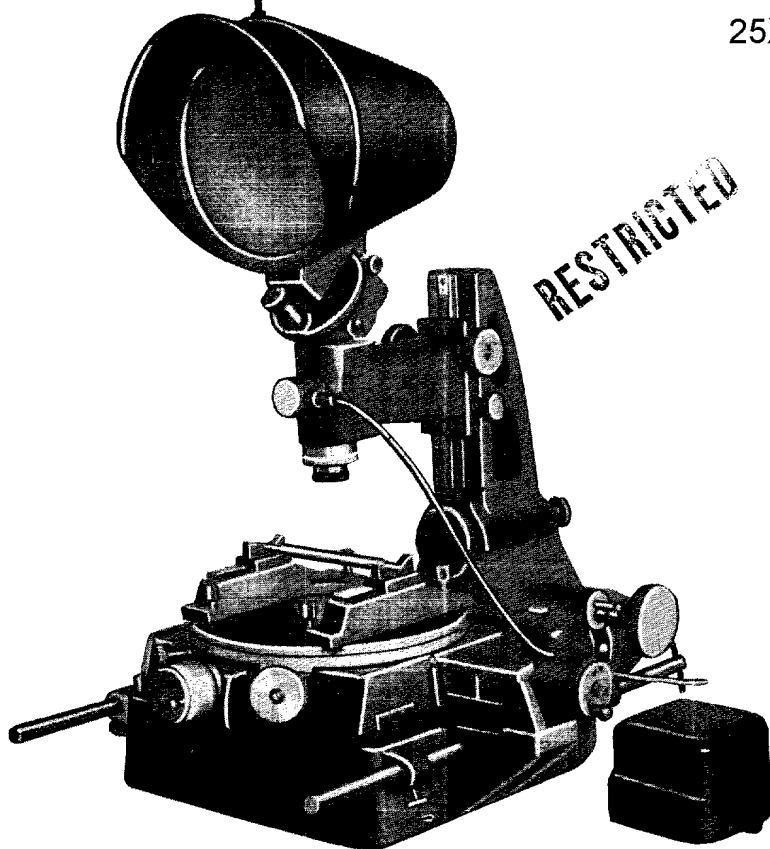
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LARGE TOOLMAKERS' MICROSCOPE MODEL БМН



The БМН Large Toolmakers' Microscope is an accurate, universal and rugged instrument designed for optical measuring and inspecting various angles or thread forms, tools, milling cutters, cams, templates and many other objects. It is intended to serve as a comprehensive measuring apparatus in the factory and laboratory.

The instrument consists essentially of a massive stand carrying a circular worktable with movements in two directions at right angles and controlled by micrometer screws. The table also has a circular motion. The microscope unit is mounted on a support column inclinable about a horizontal axis in order that the screw thread, when under observation, may be viewed from a normal to the helix angle. The protractor and thread forms are drawn on glass plates situated at the focal plane of the microscope eyepiece. To the upper end of the microscope are attached units containing a protractor or screw thread forms, which are visible in the field of view and are superimposed over the image of the object under test. Four objectives are available, which give initial magnifications of $1\times$, $1.5\times$, $3\times$ and $5\times$. The table slides are mounted on ball bearings which assure a straight and almost frictionless motion. The linear movements of the table controlled by the micrometer screws have a range of 25 mm in either direction in the horizontal plane. The insertion of gauge blocks increases the longitudinal range to 150 mm and the cross range to 50 mm.



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SPECIFICATIONS

Range of total magnification	9.1 x to 45.5 x
Objectives	1x; 1.5x; 3x and 5x
Eyepiece	9.1x
Field of view, mm	from 19.5 to 3.9
Reading accuracy of linear measurements, mm	0.005
Reading accuracy of angular measurements, minutes	1
Table travel in longitudinal and transverse directions by micrometer screws, mm	25
Maximum table travel using gauge blocks, mm:	
longitudinal	150
transverse	50
Reading of table micrometer screws, mm	0.005
Circular table graduated to 1°, reading to, minutes	3
Maximum distance between centers, mm:	
with work under 39 mm diameter	325
with work between 39 mm and 85 mm diam.	315
Maximum diameter of centred work, mm	85
Maximum diameter of work held in V-blocks, mm	130
Greatest distance between table and objective, mm	200
Depth of throat, mm	167
Range of microscope column inclination	±12° 30'
Source of microscope illumination	bulb, 15 w 120—220 v
Protractor unit illumination	bulb, 6 v, 0.35 amp.
Transformer for reducing A. C. mains (120—220 v.) down to	6 v.
Overall dimensions, mm	600x800x900
Weight of instrument, kg	81

STANDARD EQUIPMENT

Objectives 1x; 1.5x; 3x and 5x	Object column
Protractor unit	Set of gauge blocks
Transmitted light illuminator	Illuminator for protractor unit
Thread template unit	Transformer
Centers' support	Focusing attachment
V-guide	Carrying case
V-block for holding centerless parts.	

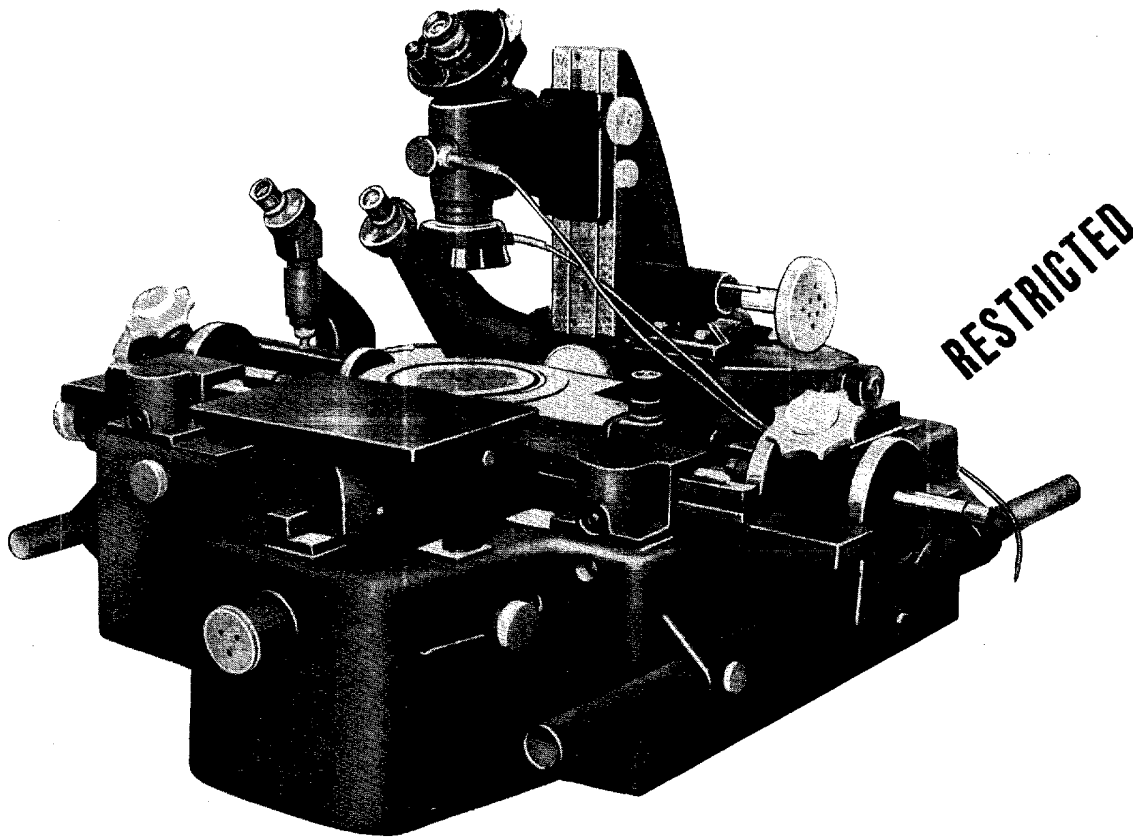
EQUIPMENT SUPPLIED AT EXTRA COST

Radius template unit
Hole center distance measuring unit
30°, 40°, 55° and 60° angle measuring unit
Projection attachment with illuminator
Camera attachment

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UNIVERSAL MEASURING MICROSCOPE MODEL УИМ-21

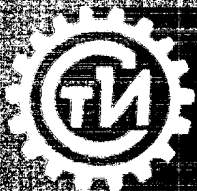
The УИМ-21 Universal Measuring Microscope is a high precision, rugged instrument designed for optical measuring and inspecting lengths, angles and various forms of thread gauges, taps, chasers, hobs, form tools, templets, tapers, cams etc.

The instrument consists essentially of a massive stand carrying longitudinal slides on which the object under measurement is placed and transverse slides with main microscope unit and illuminator. Both longitudinal and transverse slides are mounted on ball bearings which assure a straight and almost frictionless motion. Two reading microscope units are fixed on the stand providing accurate readings in the longitudinal and transverse directions.

The main microscope unit is mounted on an inclinable support column in order that the screw thread, when under observation, may be viewed from a normal to the helix angle. The microscope has a vertical movement on the support column. Both rough and fine focusing are provided.

For angular measurements a protractor unit is supplied connecting with the body tube of the main microscope. The protractor unit scale is graduated and figured to one degree. The scale is observed through a separate microscope, which also contains a fixed reticule having 60 lines to embrace 1° on the scale, thus the protractor scale is 1 division = 1 minute.

The instrument should be housed in a dry room, installed on a solid foundation or on a support table and work at 20°C .

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SPECIFICATIONS

Maximum measuring range:

longitudinal, mm 200
transverse, mm 100
angular 360°

Scale reading:

linear measurements, mm 0.001
angular measurements, minutes 1

Accuracy of linear measurement, mm ... $\pm 0.001 + \frac{L}{100,000}$
(L -- length to be measured in mm)

Numerical aperture 0.1
Objective magnification 2.2
Resolving power of objective, mm 0.003

LONGITUDINAL TRAVEL READING MICROSCOPE

Total magnification 60x
Field of view, mm 2.3
Eyepiece movement per 1 diopter, mm 0.4
Numerical aperture 0.12
Objective magnification 5x
Resolving power of objective, mm 0.0025

MAIN MICROSCOPE

Total magnification 30x
Field of view, mm 5.4
Numerical aperture 0.1
Objective magnification 3x
Resolving power of objective, mm 0.003

PROTRACTOR UNIT MICROSCOPE

Total magnification 44.8x
Field of view, mm 2
Eyepiece movement per 1 diopter, mm 0.14

TRANSVERSE TRAVEL READING MICROSCOPE

Total magnification 61.3x
Field of view, mm 2.5
Eyepiece movement per 1 diopter, mm 0.4
Numerical aperture 0.12
Objective magnification 5x

Overall dimensions of instrument, mm ... 1130x1030x800
Weight of instrument, kg approx. 420
Illumination of instrument from A. C. mains
120 or 220 volts

ACCESSORIES

Protractor unit
Objective 3x
Measuring table with bar and two clamps
Testing gauge
Collimator
Reflector

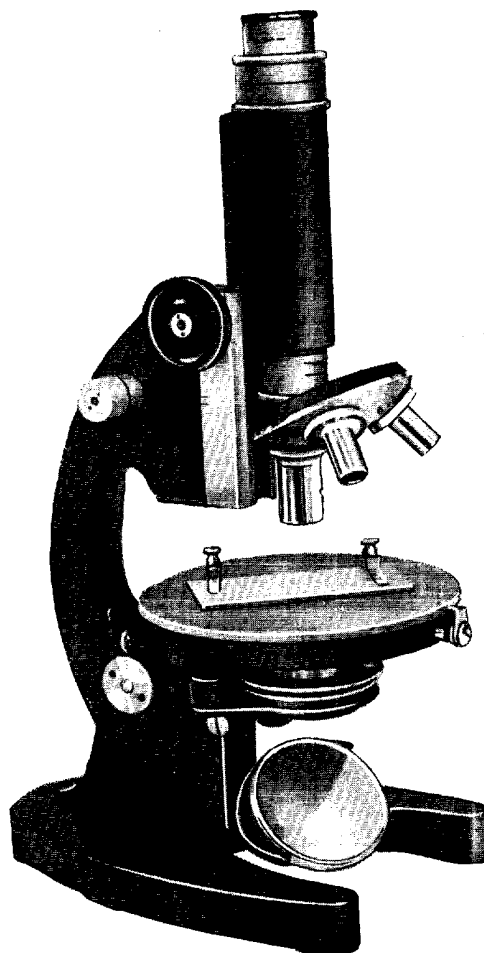
Two measuring blade clamps
Three plates with clamping bolts
Two large internal work centers
Small internal work centers
Illumination attachment
Set of measuring blades (16 pieces)

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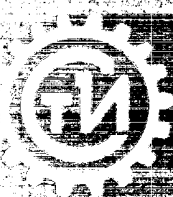
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SIMPLIFIED POLARIZING MICROSCOPE MODEL МНН-2



The Model **МНН-2** Microscope is a simplified construction of the Polarizing Microscope **МНН-1**. It has been designed for mineralogical, petrological and crystallographic investigations as well as for medical and biological research work.



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SPECIFICATIONS

Range of total magnification 25.9x to 640x
Achromatic objectives 3.7x, 8x and 60x
Eyepieces 7x and 16x
Objective changing device triple revolving nosepiece
Focusing adjustments:
 coarse by rack and pinion
 fine by micrometer screw and nut
Illuminating system plane and concave mirrors, condenser with iris diaphragm
Source of illumination any kind
Weight of microscope, kg 4.0
Weight of microscope with case, kg 8.0

ACCESSORIES

Set of three achromatic objectives
Set of two eyepieces
Portable case

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BIOLOGICAL MICROSCOPE M-9

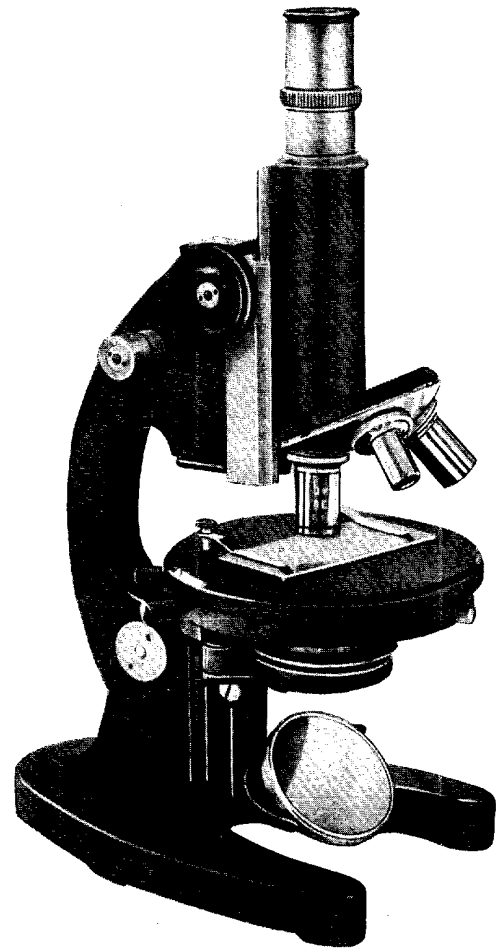
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The Model M-9 Microscope is a medium type biological microscope designed for the examination of transparent objects in transmitted light. Besides, opaque specimens too may be examined, in reflected light in low-power work.

The Model M-9 Microscope is the most universal and popular type of the biological microscopes and is widely employed in biological, medical, agricultural and various industrial laboratories, in universities and clinics.

The construction of the microscope, its fine optics, wide variety of accessories, positive and convenient operation, insure precision and excellent results in research work.



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SPECIFICATIONS

Range of total magnification 56x to 1,250x
Achromatic objectives 8x0.2 N.A., 40x0.65 N.A.
and 100x oil immersion 1.25 N.A.
Eyepieces 7x, 10x and 15x
Two-lens condenser 1.20 N.A. with iris diaphragm
Mirror concave on one side and plane on the other
Adjustable draw tube, extensible between, mm 150-210
Draw tube graduated in millimeters with a special mark indicating the tube length of 160 mm
Coarse and fine focusing adjustments. The fine adjustment drum is graduated in 2-micron intervals
Stage circular revolving and centered
Weight of microscope with accessories in case, kg 9.5
Size of wood case, mm 290 x 200 x 132

ACCESSORIES

Set of three objectives
Set of three eyepieces
Portable case

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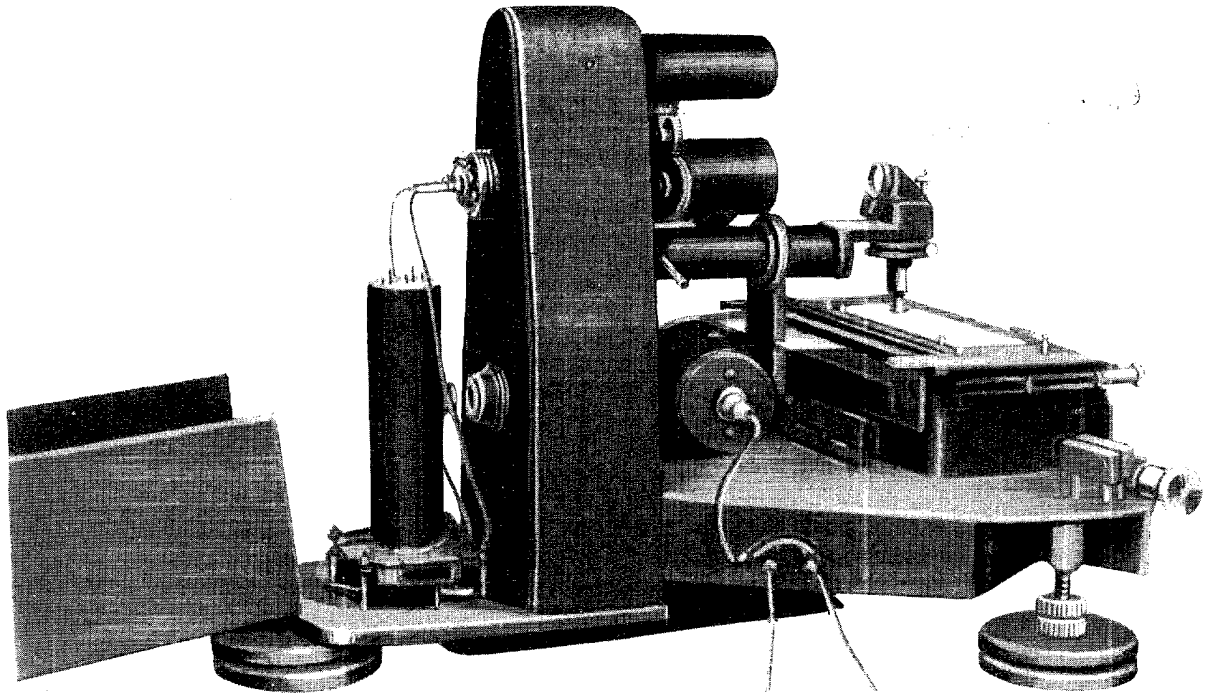
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NON-RECORDING PHOTOELECTRIC MICROPHOTOMETER MODEL MΦ-2



The NON-RECORDING PHOTOELECTRIC MICROPHOTOMETER MΦ-2 is designed for rapid and precise measurement of the density of lines in spectrograms on the photographic plates.

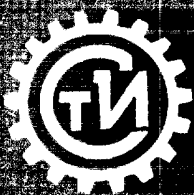
For routine methods of quantitative spectrum analysis the microphotometer is found to give the most rapid consistent results.

SPECIFICATIONS

Range of magnification	21x to 30x	Height of microphotometer, mm.	550
Objective	10x, 0.30 N.A.	Weight of microphotometer, kg.	48
Lamp of optical system	12 v., 30 w.	Weight, complete with all accessories, kg. ...	186

ACCESSORIES

Accumulator battery
Rectifier
D. C. Voltmeter
Rheostat
Spare parts



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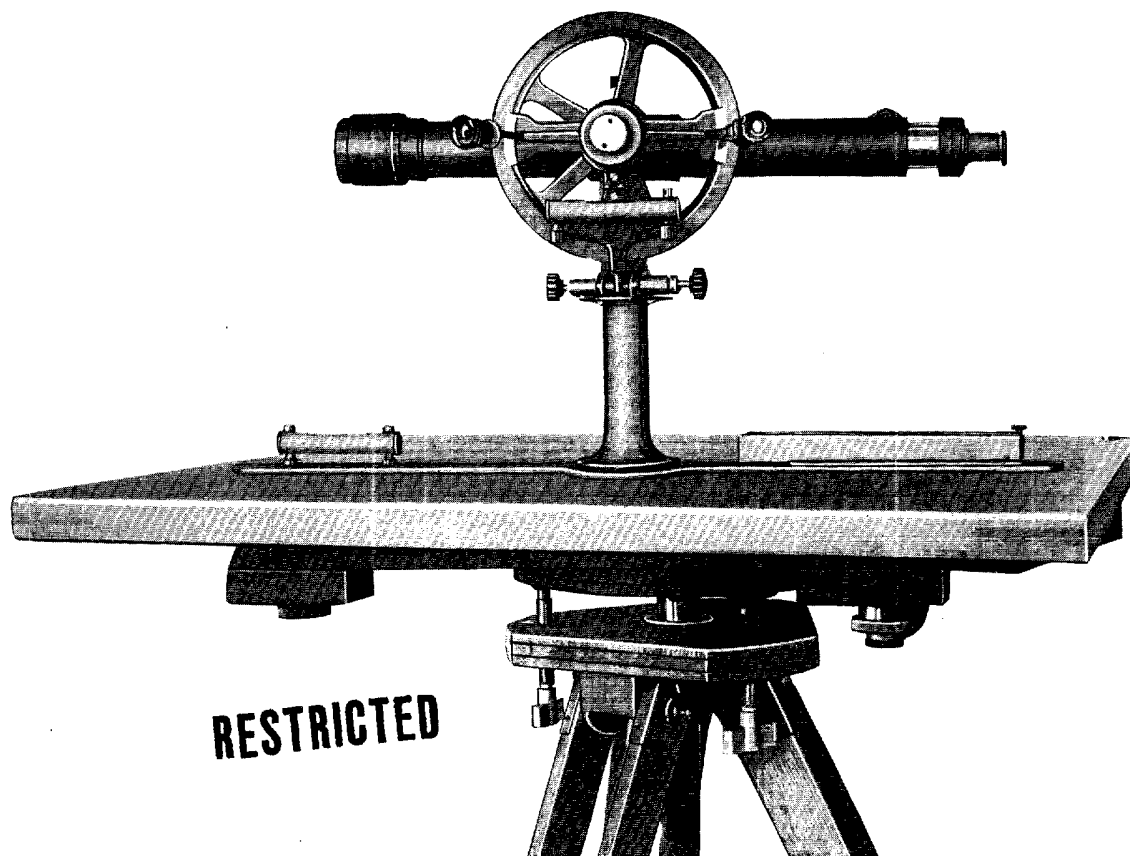
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ALIDADE WITH PLANE TABLE MODEL KB



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The ALIDADE WITH PLANE TABLE HB has been designed for laying out angles, plotting contour lines and making maps directly from the measurements made in the field.

The Alidade is characterized by fine optics, durability and ease of adjustment. The construction of the Plane Table drawing board prevents warping.



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SPECIFICATIONS

Magnification of telescope	25x
Field of view	1°
Magnification of magnifier	8x
Resolving power of telescope	4.5"
Focal length of objective, mm.	480
Focal length of eyepiece, mm.	15
Aperture of objective, mm.	34
Vertical circle divided to	30°
Circle reading by vernier to	1'
Sensitivity of blade level	50"-80"
Sensitivity of alidade level	30"-50"
Compass scale divided to	30°
Length of blade, mm.	530
Height of optical axis above the ground, mm.	265
Length of tripod, mm.	1,250
Size of plane table drawing board, mm.	600 x 600
Weight of alidade, kg.	5.0
Weight of plane table, kg.	5.5
Weight of drawing board, kg.	4.5
Weight of tripod, kg.	4.6
Weight of alidade in case with compass, kg.	14.0
Weight of plane table in case, kg.	15.3
Weight of drawing board in portable case, kg.	6.5

ACCESSORIES

Figural
Drawing board
Compass
Chain



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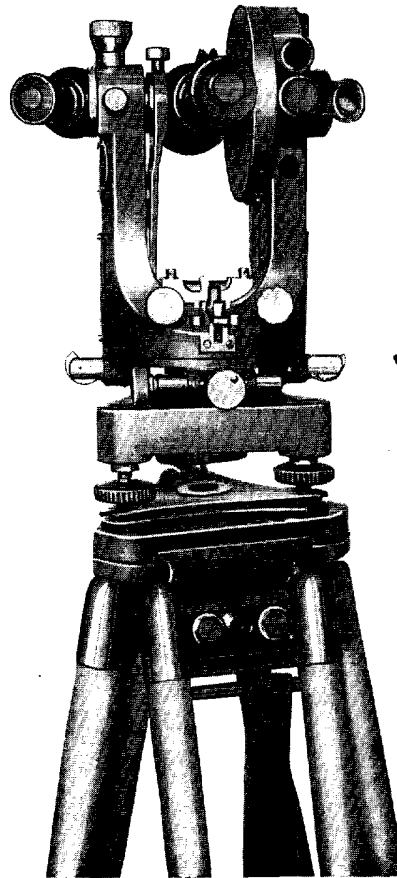
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OPTICAL THEODOLITE MODEL OT-10



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The OPTICAL-THEODOLITE OT-10 is a geodetic instrument designed for measuring horizontal and vertical angles.

It is exceptionally neat and compact in design and reads directly to 20 seconds with precision and combines accuracy of reading with simplicity of operation.



V/O "Stankoinport"
MOSCOW-USSR

SPECIFICATIONS

Magnification of telescope	25.3x
Field of view	1° 10'
Aperture of objective, mm.	40
Focal length of objective, mm.	250
Shortest focusing distance of telescope, m.	1.5
Optical micrometer for reading the horizontal and vertical circles, direct to ...	20"
Scales of horizontal and vertical circles graduated to	20"
Sensitivity of plate level per 2 mm. run	40"-60"
Sensitivity of altitude level per 2 mm. run	15"-20"
Weight of instrument, kg.	6.3
Weight of instrument in case with accessories, kg.	17
Weight of tripod, kg.	5.8
Weight of box for transporting the instrument, kg.	13
Total weight, kg.	35.8

ACCESSORIES

Eyepiece prism
 Sliding leg tripod
 Portable case
 Transporting box

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TRIANGULATION THEODOLITE MODEL TT2/6

The TT 2/6 Triangulation Theodolite is designed for measuring horizontal angles and zenith distances with the degree of accuracy necessary in first order work.

It is an extremely accurate and reliable instrument having a horizontal graduated circle and a vertical arc.

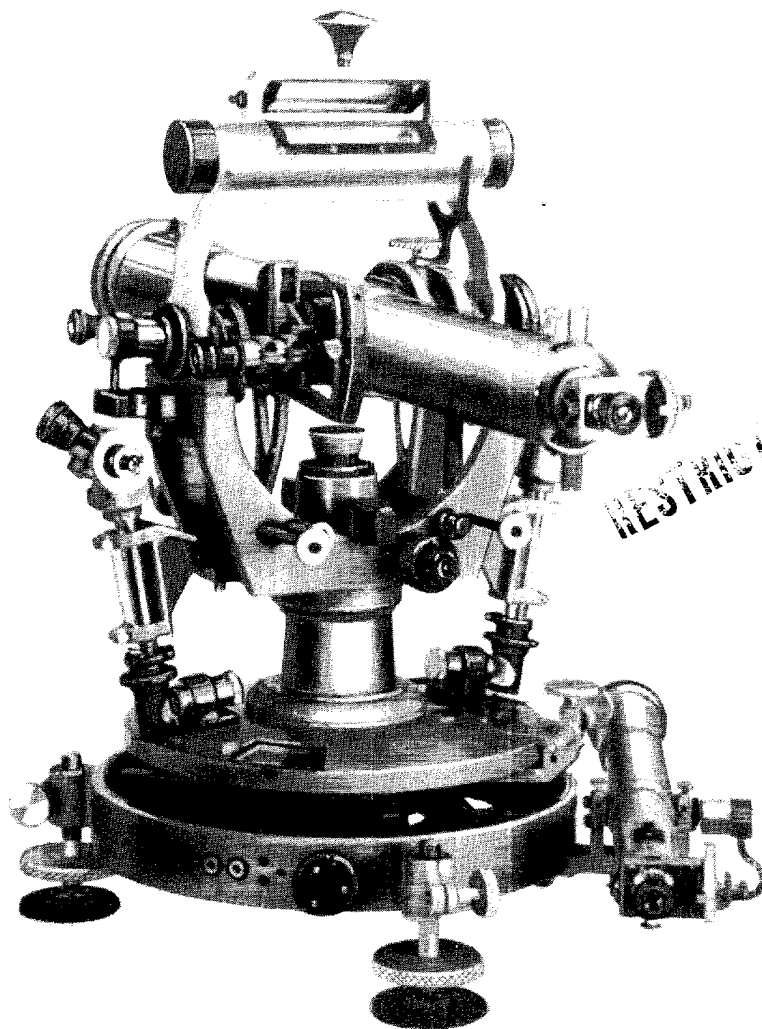
Separate optical systems for reading the horizontal circle and the vertical arc are provided, the method of reading being simple and direct.

The horizontal circle is read by two optical micrometers to an accuracy of 2".

The vertical arc reading is by two microscopes to an accuracy of 6".

The telescope permits measurement of angles between points situated at a distance of up to 60 km from the instrument.

For night work the instrument is supplied with an electric illumination.



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SPECIFICATIONS

TELESCOPE

Total magnification 52x and 65x
Field of view 0°43' and 0°37'
Resolving power of objective, mm 2.15
Aperture of objective, mm 65
Focal length of objective, mm 520
Shortest focusing distance, m 5
Focal length of eyepieces, mm 3 and 3.18
Micrometer eyepiece drum reading
..... 1"
Overall length of telescope, mm 623

AUXILIARY TELESCOPE

Aperture of objective, mm 36
Focal length of objective, mm 160
Focal length of eyepieces, mm 12
Total magnification 30x
Shortest focusing distance, m 7
Micrometer eyepiece drum reading
..... 1.4"
Overall length of telescope, mm 380

HORIZONTAL CIRCLE READING MICROSCOPES

Magnification 49x
Micrometer eyepiece drum reading
..... 2"

VERTICAL ARC READING MICROSCOPES

Magnification 48x
Accuracy of reading 6"

DIMENSIONS AND WEIGHT

Height of instrument, mm 500
Vertical dimensions, carrying cases,
mm 420 x 424 x 400
..... 207 x 300 x 400
Height of instrument, carrying
case, kg 4.5

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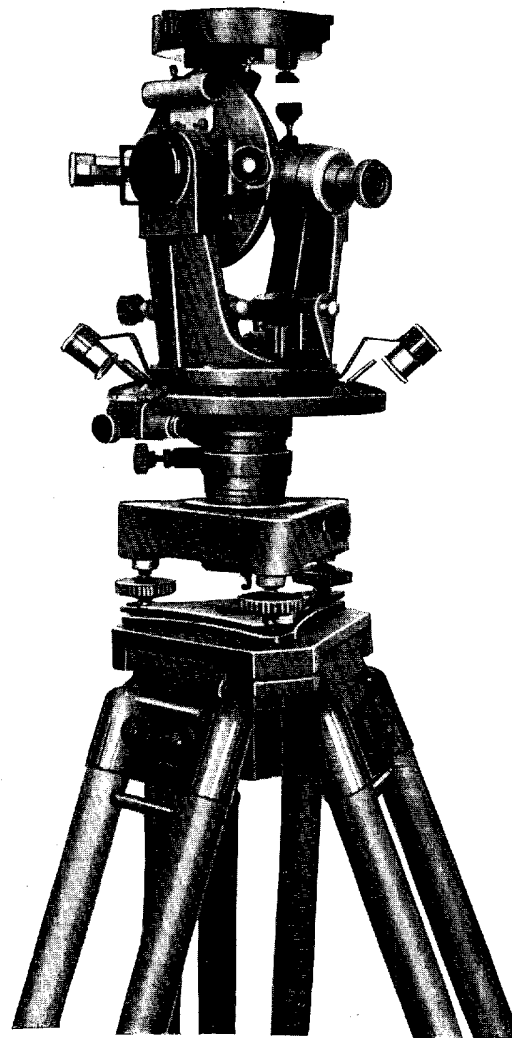
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THEODOLITE TACHEOMETER MODEL TT-2



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The THEODOLITE TACHEOMETER TT-2 is a geodetic instrument designed for measuring horizontal and vertical angles, as well as for determining distances with a stadia and a geodetic rod graduated in centimeters. It is a high-grade instrument, compact in design, simple and efficient in use. It reads directly to 30 seconds with precision.



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SPECIFICATIONS

Magnification of telescope	11.7x
Field of view	3° 10'
Resolving power of objective	5.5"
Focal length of objective, mm.	180
Stadia lines	1:100
Sensitivity of horizontal circle level	40"-60"
Reading of horizontal and vertical circles	30'
Shortest focusing distance of telescope, m.	2.0
Weight of instrument, kg.	5.4
Weight of instrument in case with accessories, kg.	11.8
Weight of tripod, kg.	5.8
Total weight, kg.	17.6

ACCESSORIES

Compass

Tripod

Portable case

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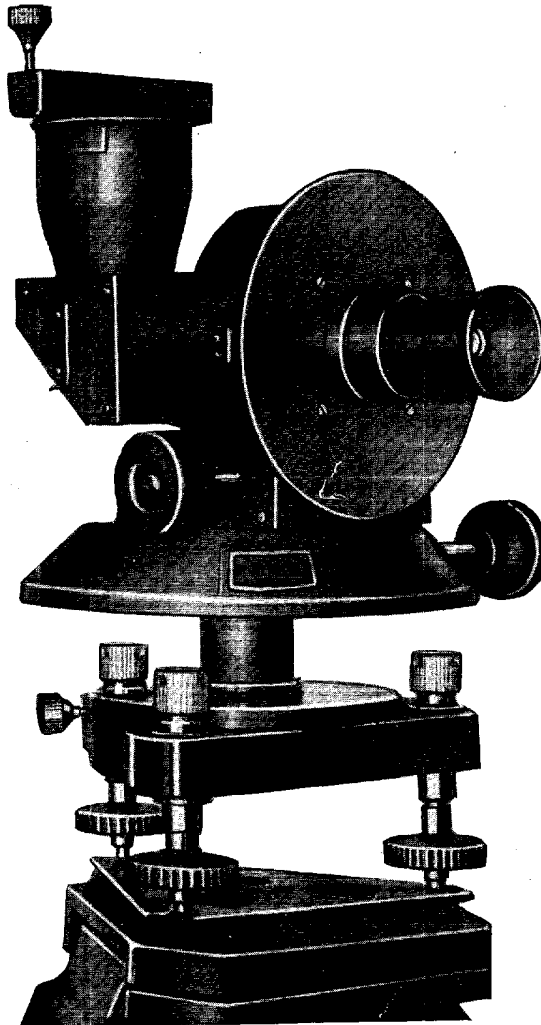
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PILOT BALLOON THEODOLITE MODEL **ЛТ**



The PILOT BALLOON THEODOLITE **ЛТ** is an instrument the construction of which allows to determine the azimuth and elevation position of pilot balloons. The horizontal and vertical angles are read on two circles to an accuracy of 0.1° .



V/O **Stankoimport**

MOSCOW-USSR

SPECIFICATIONS

Magnification of telescope	12x
Field of view of telescope	30°-45°
Horizontal and vertical circles graduated to	1°
Reading of circles to an accuracy of	0.1°
Sensitivity of level per 0.6 mm.	6"
Weight of instrument, kg.	4.9
Weight of tripod, kg.	6.1
Weight of instrument, complete set, kg.	17.5
Overall size of instrument case, mm.	200 x 250 x 340
Overall size of battery box, mm.	125 x 110 x 160
Overall size of tee case, mm.	120 x 130 x 110
Length of tripod, mm.	950

ACCESSORIES

Tripod
Box with batteries
Tee for illumination
Cases



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CAPILLAROSCOPE MODEL M70A

The Model M70A Capillaroscope is a microscope with an illuminator which permits visual examination of objects in reflected light.

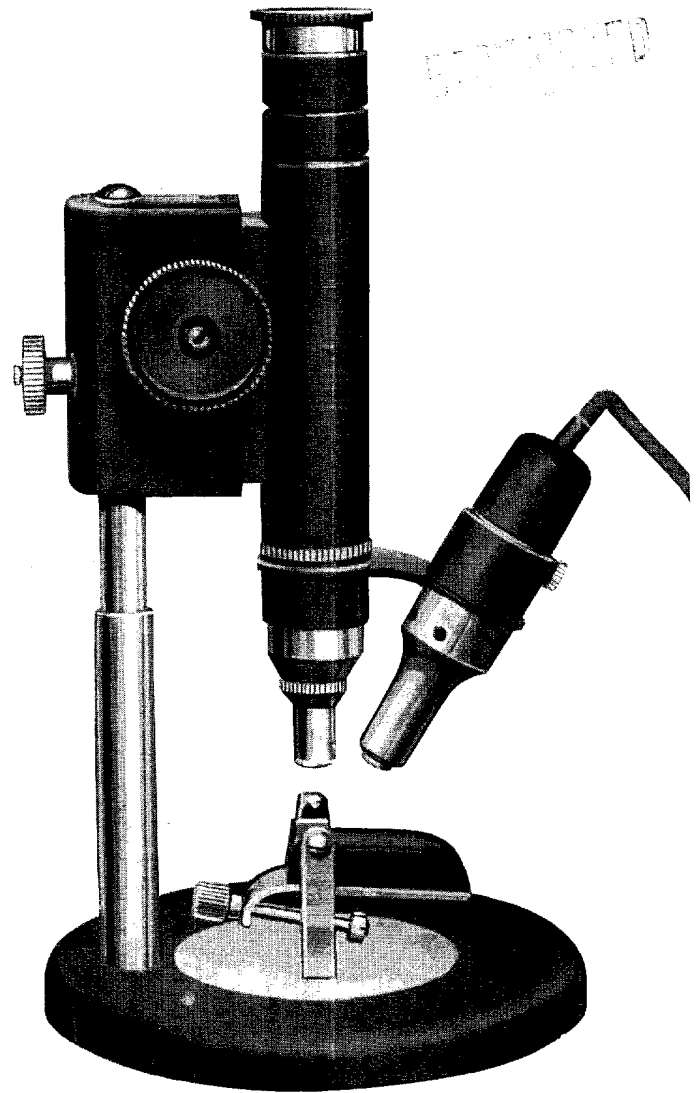
This instrument may be used as a vertical microscope for the examination of capillaries in the finger-nail limb; as a horizontal microscope for the examination of capillaries in the lip and tongue mucous membrane, or as a portable microscope for the examination of capillaries in the outward tissues of the body.

Two interchangeable eyepieces give a total magnification of 28x and 70x, and a ruled micrometer disc placed in one of the microscope eyepieces (4x) permits to make accurate measurements to 0.05 mm.

The micrometer disc scale (1 mm. long) has 20 divisions with every fourth division indicated by a numbered line. Each interval in the scale between two lines of double length is equivalent to 0.1 mm. on the object.

The eye lens is adjustable for focusing on the scale, the range of adjustment being ± 4 diopters. The objective is corrected ($\frac{2}{3}$ of field) for spherical and chromatic aberration and curvature of field.

The Capillaroscope M70A may be used successfully both for medical and other purposes requiring examination of objects in reflected light (textile, paper, printing and publishing industries, laboratories, etc.).



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SPECIFICATIONS

Total magnification	25x and 70x
Objective	7x, 0.18 N.A.
Eyepieces	4x and 10x
Field of view:	
with eyepiece 10x, mm.	2.2
with eyepiece 4x, mm.	3.4
Scale reading of micrometer disc, mm.	0.05
Total adjustment of sliding tube, mm.	50
Range of eye lens adjustment, diopters	± 4
Bulb in carrying housing	13.5 v, 0.18 amp.

ACCESSORIES

Stone
 Fixture for the examination of finger-nail capillaries
 Fixture for the examination of ocular membrane capillaries
 Fixture for the examination of corneal tissue capillaries
 Handle
 Additional disc for placing the object
 Bulb in carrying housing — 5 pieces
 Transformer TP-MI
 Carrying case
 Cleaning flannel cloth

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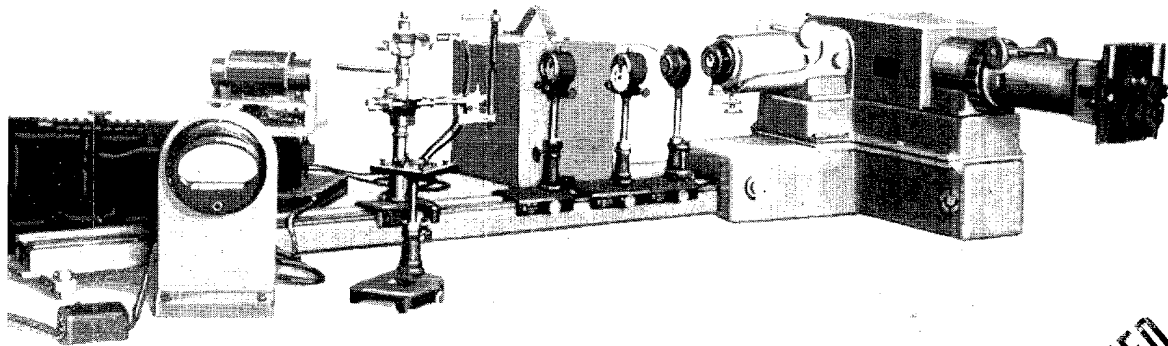
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THREE-PRISM GLASS SPECTROGRAPH MODEL ИСП-51



The ИСП-51 Three-Prism Glass Spectrograph has been designed for emission and absorption analyses, investigation and photographing of spectra.

It has principally been employed for many purposes where high dispersion is required over the visible region of the spectrum, particularly for the study of complex spectra, flame spectra and for investigating the spectra of feeble sources of light such as fluorescence etc.

The base of the spectrograph is constructed to take a bar on which a number of accessories can be mounted in correct alignment in front of the slit. The length of the bar is 1500 mm. The slit is of the symmetrical type operated by a drum graduated to indicate slit widths. The divisions are well separated permitting estimation of slit widths to a single micron. The dispersing system consists of three prisms: two of the equiangular design and one of the Abbe type.

The instrument has two interchangeable cameras: one with 120 mm. objective focal length — for spectra of feeble sources of light and the other — 270 mm. objective focal length — for work requiring higher spectrum dispersion.



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SPECIFICATIONS

Collimator objective:		
focal length, mm	134.7	
full aperture	f/5	
diameter, mm	63	
Width of collimator slit, mm	adjustable from 0 to 0.3	
Beams:		
refracting angle	63	
base, mm	73	
Interchangeable cameras		
First camera:		
objective focal length, mm	270	
full aperture	f/4.5	
Second camera:		
objective focal length, mm	120	
full aperture	f/1.9	
Size of plate, cm	6.5 x 7	
Overall dimensions of instrument (length x width x height), mm	1760 x 770 x 380	
Height of optical axis above table surface, mm	500	
Weight of instrument (with bar), kg	116	
Weight of instrument in carrying case, kg	120	

ACCESSORIES

Bar
Two interchangeable cameras
Shutter with comparison prism
Diaphragm
Shutter
Set of spare parts and accessories
Carrying case

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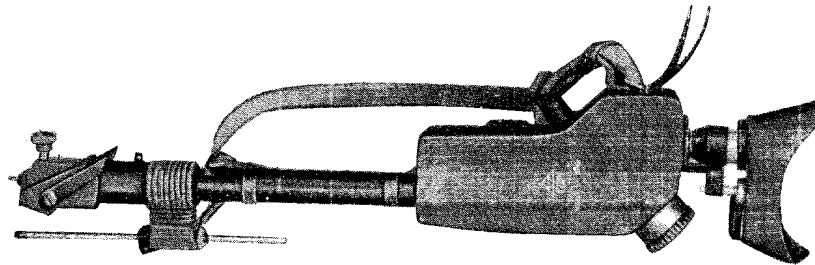
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PORTABLE STEELOSCOPE MODEL СЛП-1

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The СЛП-1 Portable Steelscope is a specialised spectroscope designed for the rapid qualitative and approximate quantitative analysis of metallic elements in steels. The instrument enables the presence of the metals Chromium, Nickel, Tungsten, Vanadium, Cobalt, Molybdenum and Manganese to be detected at once in steel bars, steel scrap or steel work-pieces even by an unskilled observer.

Specimens of the alloy under examination are used as the poles of an electric arc, and the light from this is spread out by the steelscope into a series of lines whose positions are distinctive of the metals present in the specimens.

The Portable Steelscope finds wide application in metallurgical works, rolling mills and metal working industries for the rapid control of steels, where it is inconvenient or difficult to take the specimen to a stationary type steelscope.

SPECIFICATIONS

Spectrum range 3890 Å—7080 Å
 Angle of beam incident on prism .. 61°
 Magnification of instrument II.IX
 Field of view 1°15'

Focal length of condenser, mm.... 58.3
 Focal length of objective, mm..... 322.2
 Focal length of eyepiece, mm 28.8
 Current required 120 or 220 v. A.C.

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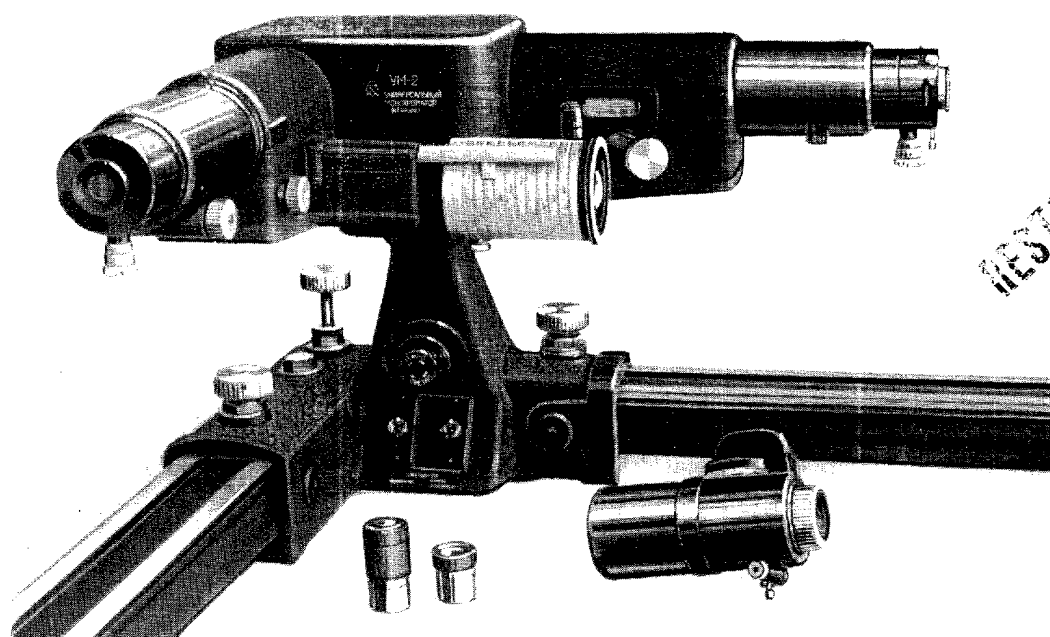
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UNIVERSAL MONOCHROMATOR MODEL YM-1



The YM-1 Universal Monochromator is an instrument of the constant deviation type with wave-length scale. It can effectively be used as a monochromator or as a spectroscope.

The prism system consists of two rotating prisms so arranged as to reduce doubling of images to the minimum and to prevent reflections.

The telescope and collimator are both rigidly fixed, since to pass through the spectrum it is only necessary to rotate the prisms; and as a result a construction is arrived at which is at once extremely convenient and mechanically sound.

The prisms are rotated by means of a micrometer screw to which is fixed a drum on which the wave length of the line under observation is read by the observer without quitting the eyepiece.

The collimator slit is of the symmetrically moving type, of efficient design and is completely enclosed. The micrometer screw has an adjustable drum graduated to read to 0.01 mm slit width.

The instrument is widely used in research and workshop laboratories.



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SPECIFICATIONS

Spectrum range	3500 Å to 10000 Å
Dispersing system	constant deviation type
Refracting angle of prisms	60°
Angle of rotation of prisms within spectrum working range	
prism I	41°43'21"
prism II	39°15'40"
Collimator objective:	
focal length, mm	280
aperture ratio	f: 6.2
Achromatic condenser:	
focal length, mm	82
lens diameter, mm	30
Collimator slit:	
height, mm	15
adjustable width, mm	from 0 to 1.5
Magnification of eyepieces	5x and 10x
Linear magnification of spectrograph	1x
Overall dimensions of instrument, mm	520x490x360
Overall dimensions of instrument on base, mm	1530x1100x360

ACCESSORIES

Support with achromatic condenser
 Two lenses with frame
 Two 5 and 10x and 1.5x collars
 Set of spare parts
 Carrying case

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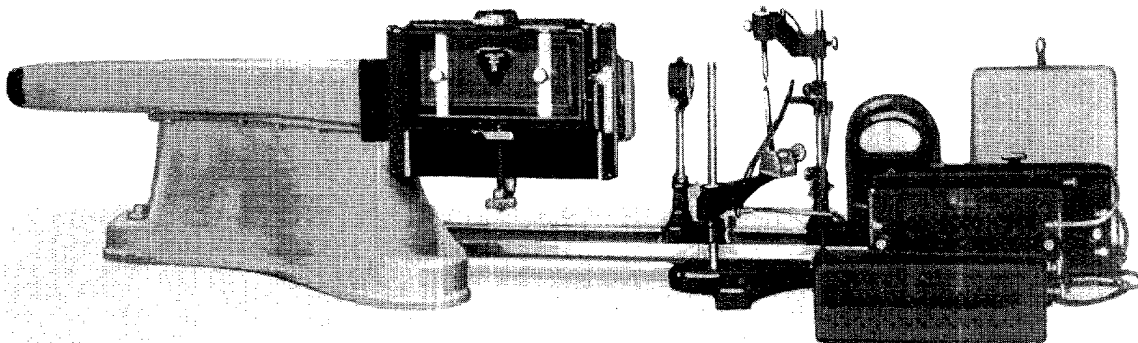
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QUARTZ SPECTROGRAPH MODEL ИСП-22



The ИСП-22 Quartz Spectrograph has been designed to meet the need for an instrument of high optical quality to be used for both qualitative and quantitative emission spectrum analysis of ferrous and non-ferrous metals and alloys, ores, minerals and many other types of materials.

The instrument may also be used for absorption work.

The quality of the line imagery throughout the spectrum is exceptionally good, the lines being sharp and clean cut to the very ends of the plates.

The base of the spectrograph is constructed to take a bar, on which the electrode and condenser supports are mounted. The length of the bar is 1500 mm.

The slit is operated by a drum graduated to indicate slit widths in units of 0.01 mm.

The quartz prism is of the Cornu type, half of right, half of left-hand quartz, to neutralize the effects of double refraction.

A handwheel and screw mechanism serves to raise or lower the plate holder and permits the taking of as many spectra as desired on a single plate.

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SPECIFICATIONS

Spectrum range	2000 Å - 6000 Å
Spectrum length, mm	225
Prism	
height, mm	36
base, mm	47
refracting angle	60°
angular dispersion	9-40'
Prism is set for minimum beam deviation at wave length	2573 Å
Camera objective	two-conv. quartz, achromatic
Focal length of objective (2573 Å), mm	831
Focal length of objective (5893 Å), mm	921
Diameter of objective, mm	45
Full aperture of collimator	1/3
Linear magnification of spectrograph (ratio of focal lengths of illuminating and camera lenses)	1 - 1.5x
Maximum deviation of focal plane from plane plane, mm	max
Electron supply for spark generator	0-120-20 v. AC, 50 Hz
Overall dimensions of instrument (length x width x height), mm	1700 x 700 x 460
Height of optical axis above table surface, mm	350
Height of optical axis above bar surface, mm	213
Height of instrument above table surface, mm	300
Weight of instrument, complete, kg	1.0
Weight of instrument in carrying case, kg	1.0

ACCESSORIES

Bar
Non-ferrous support
Upper electrode support
Lower electrode support
Spark generator
Set of spare parts and service tools
Carrying case

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SPECTRUM PROJECTOR MODEL ПС-18

The most convenient and least fatiguing method of observing spectrum negatives is to project their enlarged images upon a screen where they can be seen under normal conditions of vision.

The ПС-18 Spectrum Projector has been designed to make full use of the advantages of the projection method of examination.

The projection surface is horizontal and formed upon the base of the instrument, above which the projection system is supported on a rigid framework.

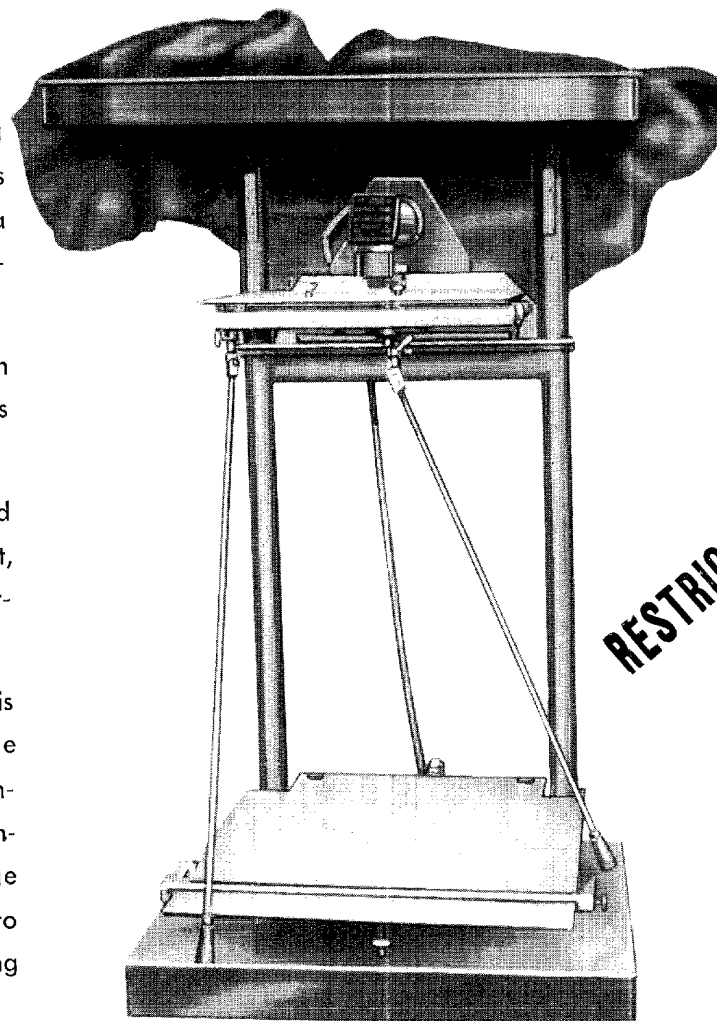
The negative which is to be projected is supported on a horizontal mechanical stage whose rack - and - pinion motions are controlled by extended shafts with handles conveniently placed for the observer. The stage will accommodate any size of plate up to 13×24 cm and has spring clips for holding the plate in position.

A magnification of $20\times$ is obtained by means of a specially selected projection lens of great light gathering power and with sharp definition.

The projection unit is furnished with a well ventilated lamphouse with condensing lens system, and an 11 volt 100 watt lamp. The latter is run conveniently from a transformer connected with A. C. mains.

The instrument provided also for photographing the enlarged image of spectrograms.

The Spectrum Projector finds wide application in industrial and educational laboratories.



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SPECIFICATIONS

Size of spectrogram, cm (inches)	up to 13x24
Magnification	20x
Accuracy of measurement of spectrum line distances, mm (inches)	± 0.01
Maximum permissible distortion	2%
Projection lens:	
focal length, mm (inches)	27
full aperture	F 4.5
field of view, mm (inches)	18
resolving power	30"
Overall dimensions of instrument (length x width x height), mm (inches)	605 x 555 x 90 (0
Weight of instrument, kg (pounds)	35
Weight of instrument with accessories in carrying case, kg (pounds)	38

ACCESSORIES

- Transformer 120-220/12
- Set of spare parts and service tools
- Carrying case.

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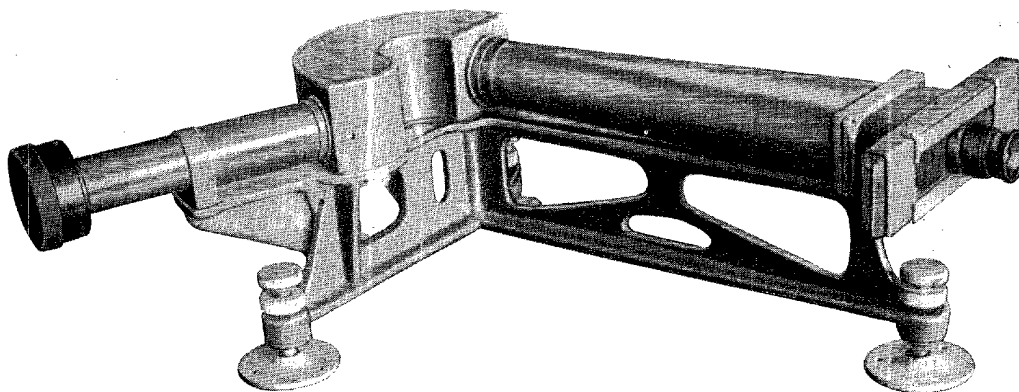
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STEELOSCOPE MODEL СЛ-3



The СЛ-3 Steeloscope is a specialised spectroscope for the rapid estimation of metallic elements in steels.

The instrument enables the presence of the metals Chromium, Nickel, Tungsten, Vanadium, Cobalt, Molybdenum and Manganese to be detected at once in steel bars, steel scrap or steel work-pieces even by an unskilled observer. A few days' experience with bars of known chemical content will enable the operator also to state the approximate percentage present.

Specimens of the alloy under examination are used as one pole of an electric arc, the other pole being a rod of iron. The light from the arc is spread out by the steeloscope into a series of lines whose positions are distinctive of the metals present in the specimens.

The apparatus consists of two tubes-collimator and telescope-joined by a metal body. The body contains the prisms which produce the spectrum.

The collimator has a narrow slit through which the light from the specimen passes into the steeloscope. The telescope has an eyepiece which can be moved to definite positions indicated by engraved chemical symbols. At each position can be seen the most distinctive spectrum lines of the metal whose symbol is there inscribed.

The Steeloscope is used in stores, scrap yards, workshops and laboratories.

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SPECIFICATIONS

Working spectrum range.....	3890 Å—6700 Å
Interchangeable telescope eyepieces.....	12.5 x and 20 x
Magnification of telescope:	
with eyepiece 12.5 x.....	19 x
with eyepiece 20 x.....	30.4 x
Telescope objective.....	two-lens, achromatic, focal length 380 mm
Collimator:	
width of slit, mm.....	0.018—0.02
objective.....	two-lens, achromatic, focal length 190 mm
Dispersing system:	
number of prisms.....	3
prisms made of.....	flint glass with refractive index 1.6475
refracting angle.....	60°
angular dispersion (4341 Å—5893 Å).....	6° 09'
Current required.....	150—220 v, 1—2 kW, D.C.
Time required for the analysis of a specimen, min.....	2—3

ACCESSORIES

iron bar support
Condenser
Rheostat
Two iron bars
Carrying case

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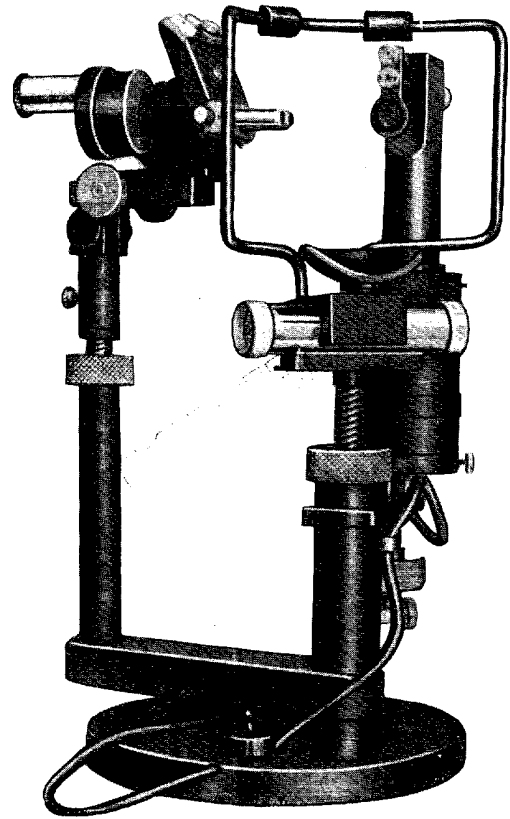
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DO NOT DETACH**SLIT LAMP MODEL IIIA**

25X1A

The Model IIIA Slit Lamp is a medical instrument that permits the ophthalmologist to make a differential diagnosis in many cases of eye pathology. Cellular and allied pathological changes within the media of the eye may be diagnosed long before the appearance of clinical symptoms. The instrument is almost indispensable to the ophthalmologist for routine procedure as well as scientific investigations.

The binocular microscope supplied with the instrument has two focusing adjustments in the vertical and horizontal directions. The microscope may be also rotated around a vertical axis. The revolving nosepiece fitted with paired objectives of 2 x and 4 x, permits quick changes of magnification. Three paired eyepieces of 4 x, 10 x and 15 x are supplied, giving a range of total magnification from 8 x to 60 x. The illumination system applied is the most flexible and efficient for examination of the human eye. The intensely illuminated slit of light may be varied in length and width. The condensing lens system, with the objective lens enables the operator to focus a slit of light to a narrow, sharply defined beam.

The chin-rest post has a manual forward and backward movement on a horizontal sleeve. Fine movement is obtained through the use of a micrometer screw. The chin-rest post has also a rotation around a vertical axis, thus providing changes of its position to the microscope and lamp.



ACCESSORIES

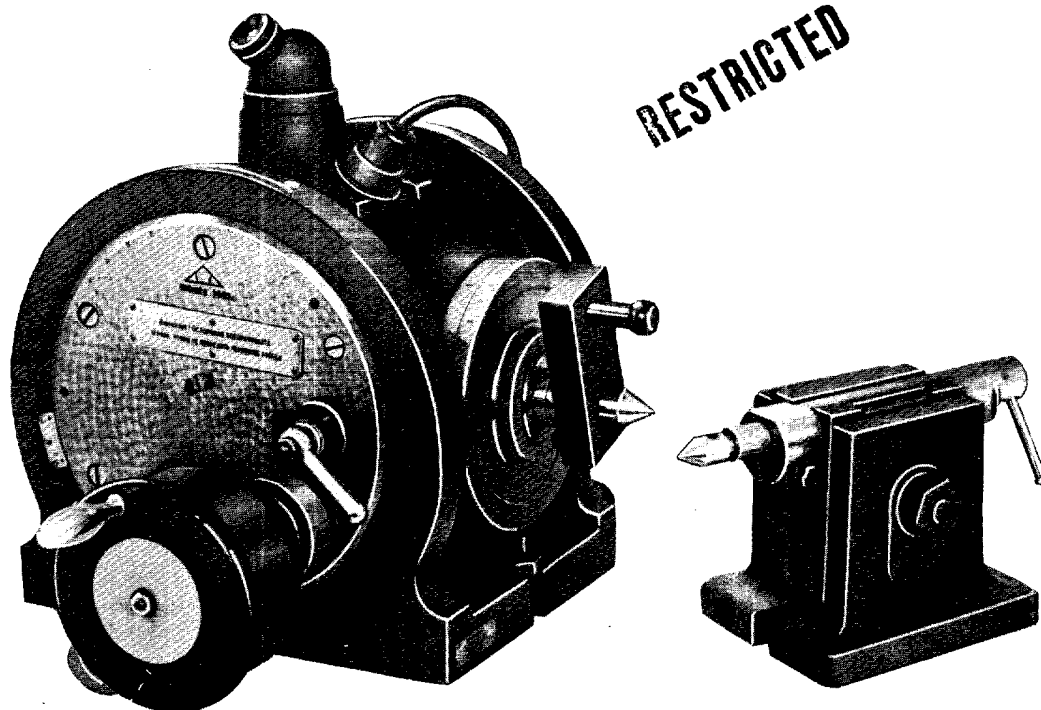
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OPTICAL DIVIDING HEAD MODEL ОДГ



The OPTICAL DIVIDING HEAD ОДГ is a high precision instrument designed for laying out and checking angular spacing and angular locations of gear teeth, splines, cams and other different work pieces.

The graduated circle of the instrument is mounted co-axially with the main spindle and its movement is observed with a microscope, having a scale fixed at the focal plane of the eyepiece.

The dividing head is mounted in a cradle in order that the measuring spindle may be capable of adjustment through 90° in the vertical plane. An exterior scale and vernier are provided to facilitate this.

The instrument has been built to provide a standard of angular measurement to satisfy the most exacting requirements in engineering production.

SPECIFICATIONS

Magnification of microscope	60x
Scale of circle graduated to	1°
Eyepiece scale graduated to	1'
Guaranteed accuracy of instrument :	
when used for measuring	20"
when used for machining purposes (drilling, milling)	30"
Adjustment of measuring spindle in vertical plane	90°
Vernier reading of exterior scale	6'
Height of center above base, mm.	130
Taper hole in spindle	Morse No. 4
Overall size of dividing head, mm.	340 x 400 x 390
Overall size of tailstock, mm.	150 x 250 x 140
Weight of dividing head and tailstock, kg.	76

ACCESSORIES

Tailstock
Work driver
Headstock center
Set of wrenches
Spindle lamps

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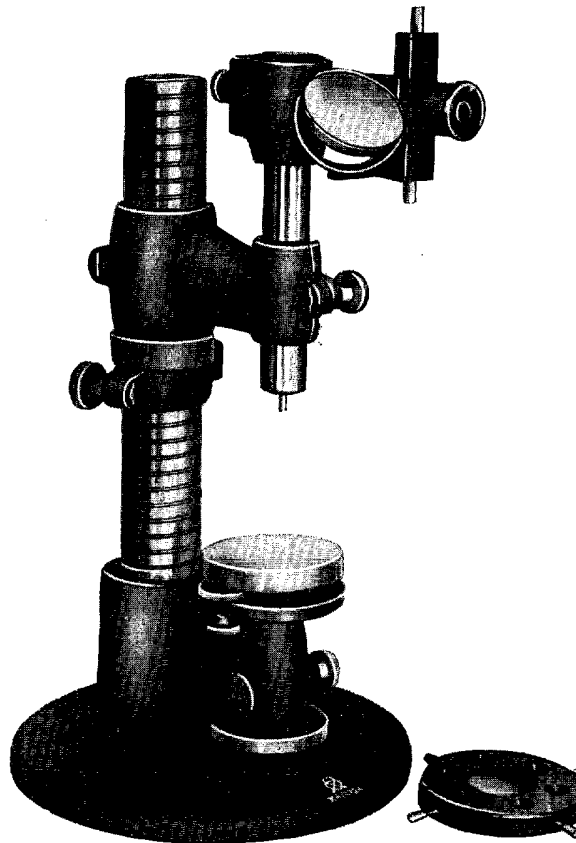
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VERTICAL OPTICAL COMPARATOR

MODEL ИKB



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The Model ИKB Vertical Comparator is a precision measuring instrument designed for making external measurements on various types of objects in the toolroom, inspection room and laboratory.

The instrument acts as a comparator between the gauge block and the object being measured.

An attachment for the projection of the comparator scale on a special screen, and a fixture for measuring wire diameter, can be supplied at extra cost.



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SPECIFICATIONS

Graduation of scale, mm	0.001
Range of scale, mm	± 0.1
Accuracy of measurement, mm	± 0.0003
Maximum height of work checked, mm	180
Maximum external diameter checked, mm	150
Measuring pressure, g	200 ± 20
Overall dimensions, mm	310 x 240 x 560
Net weight, kg	40

STANDARD EQUIPMENT

Fixture for measuring block gauges
 Spherical contact tip
 Flat contact tip
 Three back stops
 Adjustable mirror for scale illumination
 Trigger release

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VERTICAL COMPARATOR MODEL ИЗВ-1

The ИЗВ-1 Vertical Comparator is designed for absolute measurements of length of any objects within its range.

The instrument consists essentially of a massive stand carrying a worktable, measuring head and a microscope.

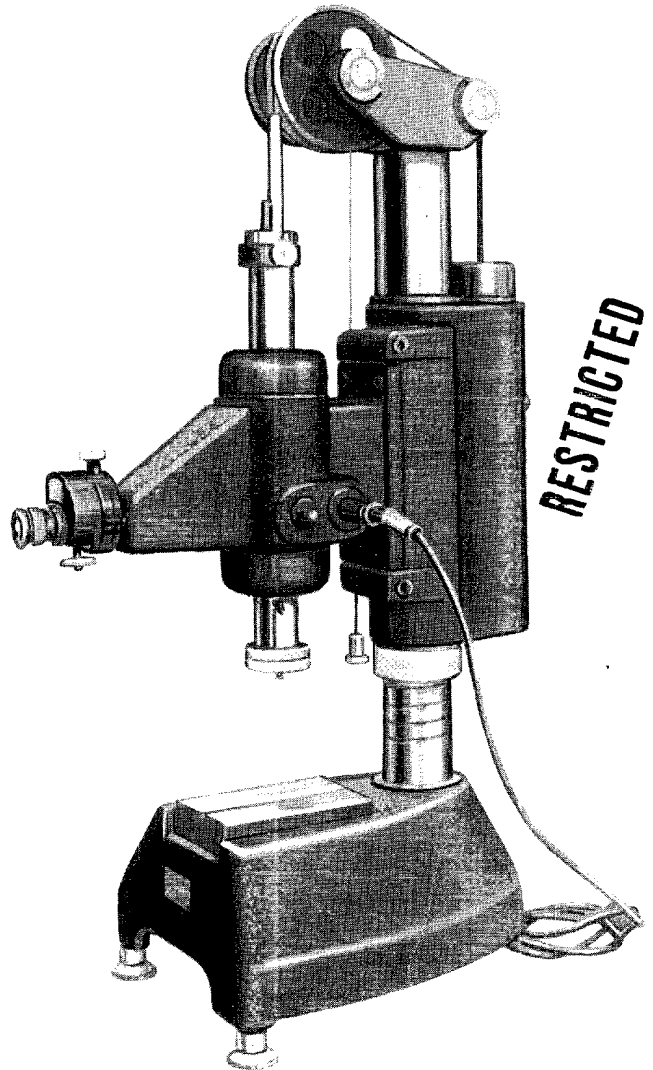
The measuring head plunger, which contacts with the work, controls the movement of the glass scale having 100 divisions, each division being equal to 1 mm.

Objects from 100 mm up to 250 mm are measured by resetting the measuring head using gage blocks.

The glass scale is viewed through the micrometer eyepiece of the microscope reading to 0.001 mm. Estimations can easily be made to tenths of a micron.

The glass scale is illuminated by light from an electric lamp passed through a green filter.

The instrument is provided with three forms of tips. The tips are easily interchanged by releasing the small clamp screw.



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SPECIFICATIONS

Maximum measuring range:	
without gage blocks, mm	0-100
using gage blocks, mm	0-250
Glass scale reading, mm	0.01
Micrometer eyepiece reading, mm	0.001
Accuracy of measurement, mm	0.001
Microscope magnification	200-1000
Measuring pressure, g	15-250
Surface of work table, mm	95 x 140
Distance, center of measuring plunger to 0 um, mm	11
Source of illumination	Light bulb 3.5 V, 0.25 amp
Current supply	11-220 V, A.C.
Height of instrument, mm	220
Width of instrument, mm	240
Weight of instrument, kg	approx. 5.1

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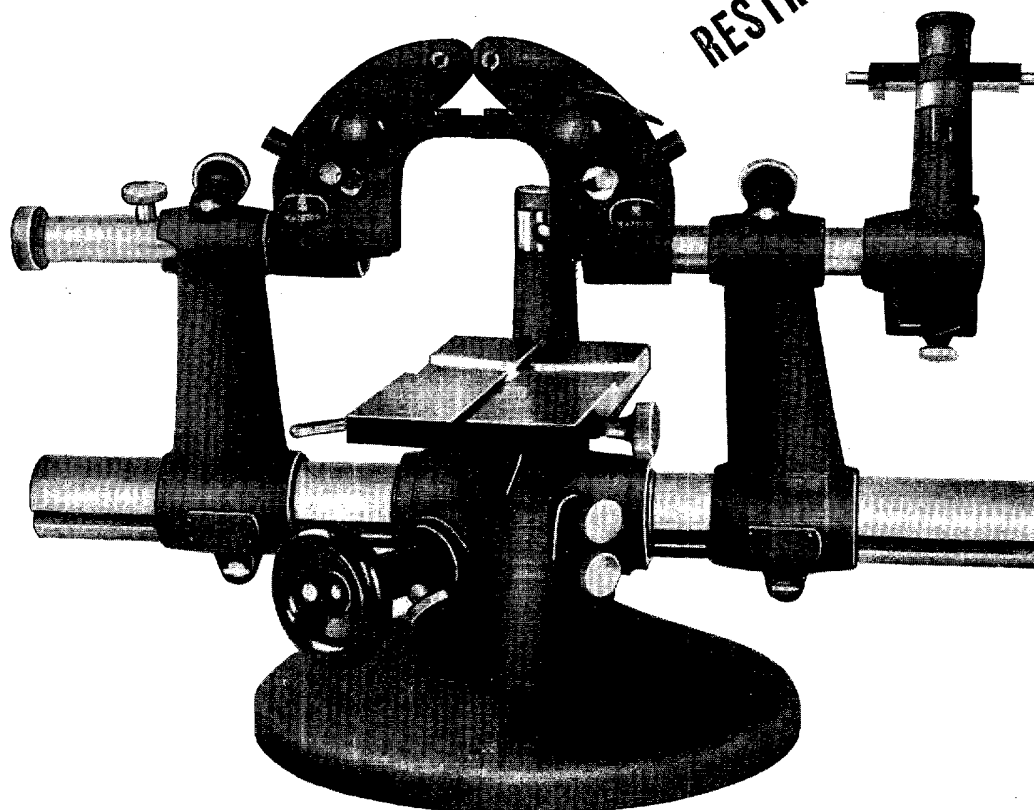
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HORIZONTAL OPTICAL COMPARATOR

25X1A

MODEL ИКГ

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The Model ИКГ Horizontal Comparator is a precision instrument, which is very convenient in making external and internal measurements on plain and thread gauges and on various types of objects in the toolroom, inspection room and laboratory.

The instrument acts as a comparator between the gauge block and the object being measured.

An attachment for the projection of the comparator scale on a special screen, and one pair of hanger arms for internal measuring up to 5 mm. diameter, can be supplied at extra cost.



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MOSCOW-USSR

SPECIFICATIONS

Graduation of scale, mm	0.001
Range of scale, mm	± 0.1
Accuracy of measurement, mm	± 0.0003
Maximum external diameter checked, mm	350
Maximum internal diameter checked, mm	150
Minimum internal diameter checked, mm	13.5
Minimum internal diameter checked with special hanger arms, mm	5
Maximum height of ring gauge checked, mm	56
Vertical table movement, mm	86
Measuring pressure, g	200 ± 20
Overall dimensions, mm	875 x 300 x 340
Net weight, kg	48

STANDARD EQUIPMENT

One pair of hanger arms for internal measuring up to 13.5 mm diameter
 Two spherical contact tips
 Two flat contact tips
 Vee blocks and clamps
 Adjustable mirror for scale illumination
 Trigger release

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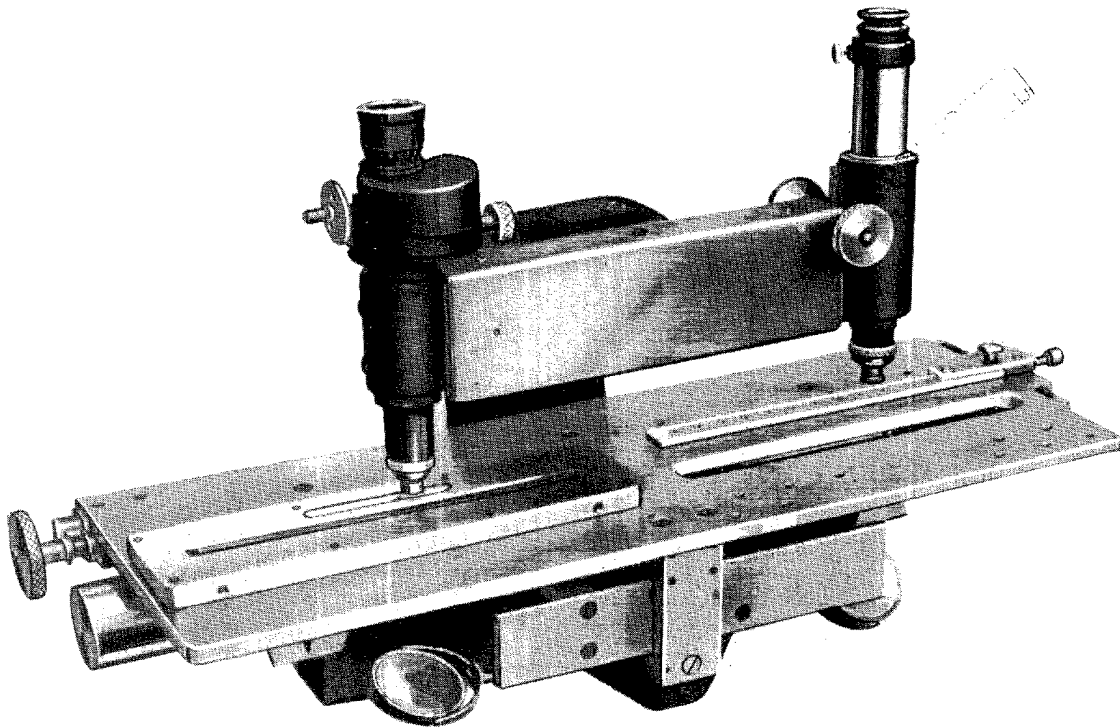
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HORIZONTAL COMPARATOR

MODEL И3А-2



The И3А-2 Horizontal Comparator is designed for the measurement of spectrograms, linear scales and any length within the range of the instrument master scale.

The instrument consists essentially of two fixed microscopes and one moving stage on which the master glass scale and the specimen being measured are mounted.

The arc-type support on which the microscopes and stage are mounted permits the instrument to be operated either vertically (the object horizontal) or inclined at 45° for greater convenience.

Both rough and fine adjustments of the longitudinal movement of the stage are provided.

The microscope set over the specimen being measured has two interchangeable reticles while the measuring microscope set over the master scale is supplied with a micrometer eyepiece which reads direct to 0.001 mm. Estimations can easily be made to tenths of a micron.

The comparator is used in measuring laboratories of metal working industries and scientific research institutes.

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SPECIFICATIONS

Magnification of object microscope from 7x to 10.5x
Magnification of measuring microscope 61.5x
Range of measurement, mm 0 - 200
Accuracy of measurement, mm 0.001
Temperature rate when measuring $20^{\circ} \pm 0.2^{\circ} \text{C}$
Overall dimensions of instrument (length x width x height), mm 610 x 300 x 390

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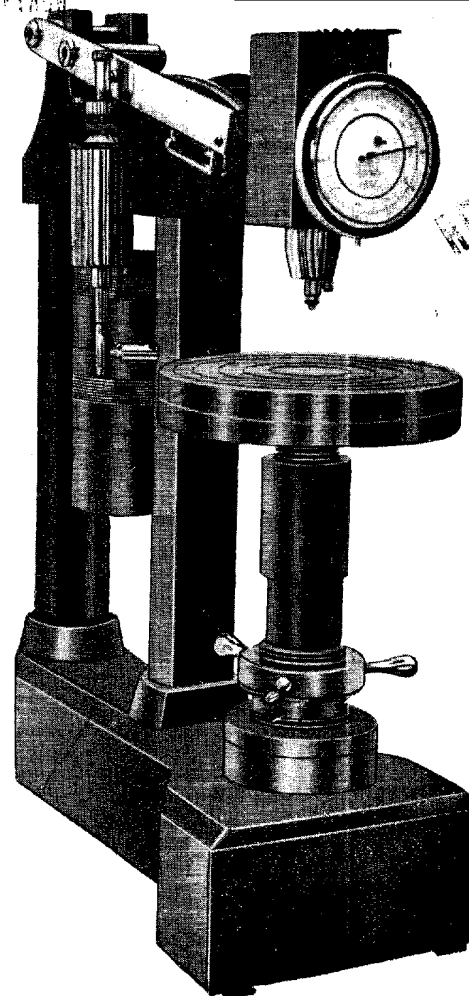
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DIRECT READING HARDNESS TESTING MACHINE (ROCKWELL PRINCIPLE)



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Model
PB

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PB

The PB Direct-reading Hardness Testing Machine is designed to perform the Rockwell tests in laboratories and works, using a hardened steel ball or a diamond cone penetrator.

The test is standardized and is performed in the following stages:

A minor load is applied to the penetrator to eliminate effects on the final reading due to surface imperfections in the objects under examination and provide a datum for hardness measurement. A major load is then added and the depth of penetration produced by increment of load is taken as the measure of hardness. A reading is made directly on a scale, which is arranged so that the deeper the penetration the lower the reading. The number is therefore a direct measure of the hardness.

The load is applied by standardized dead weights and lever.

The load is held for the standard test period of 5—6 sec.

The specimen to be tested is carried on the table of the machine and is brought into contact with the ball or diamond cone penetrator by turning the handle on the table elevating screw.

S P E C I F I C A T I O N S

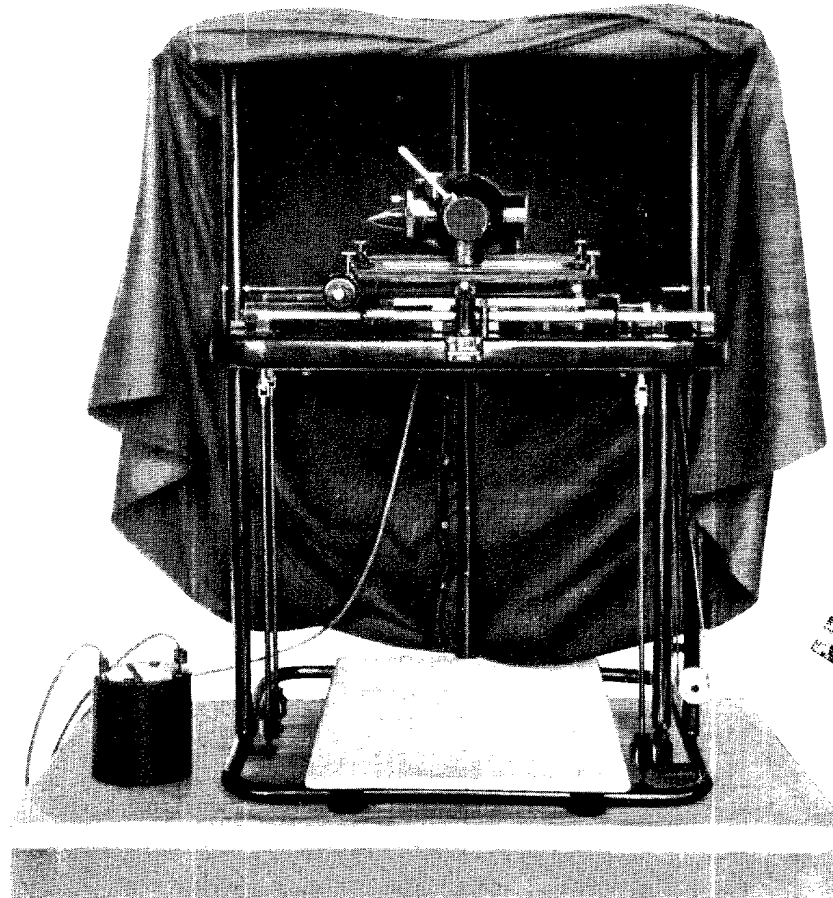
Minor load, kg	10
Major loads, kg	150; 100; 60
Accuracy of the machine, hardness number	2
Maximum height of specimen, mm	200
Distance from center of impression to column, mm	135
Net weight (including weights), kg	approx. 60
Overall dimensions of the machine, mm:	
height	650
length	500
width	220

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DOUBLE SPECTRUM PROJECTOR, MODEL ДСП-1

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The most convenient and least fatiguing method of observing spectrum negatives is to project their enlarged images upon a screen where they can be seen under normal conditions of vision.

The ДСП-1 Double Spectrum Projector has been designed to make full use of the advantages of the projection method of examination.

The projection surface is horizontal and formed upon the base of the instrument, above which the projection system is supported on a rigid framework.

The instrument enables simultaneous projection of two spectrograms so that they can be viewed in direct comparison with known or standard spectrograms.

The Double Spectrum Projector is used in scientific research institutes and industrial laboratories.



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SPECIFICATIONS

Magnification	22x
Lens: type projection lens:	
focal length, mm	327
full aperture	1:3.5
Source of light	12 v, 10 w lamp
Transformer for reducing A.C. mains (120 - 220 v) to	12 v
Overall dimensions of instrument, mm	570 x 600 x 900
Weight of instrument, kg	40.0
Weight of instrument with case, kg	44.0

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CONTOUR MEASURING PROJECTOR, MODEL БП

The БП Contour Measuring Projector is an optical projection machine for measuring or comparing objects by means of a magnified shadow. This instrument has many applications in the rapid inspection and measurement of: contour of forming tools, form of cams, screw threads, thread gauges, hobs, form of gear teeth, form and dimensions of punches and dies, irregularly shaped production parts, etc. It permits also drawing with high precision the contour of an object under investigation.

The stage and horizontal screen are so positioned that the operator's vision takes in both the object to be measured and the enlarged shadow reflected on the screen.

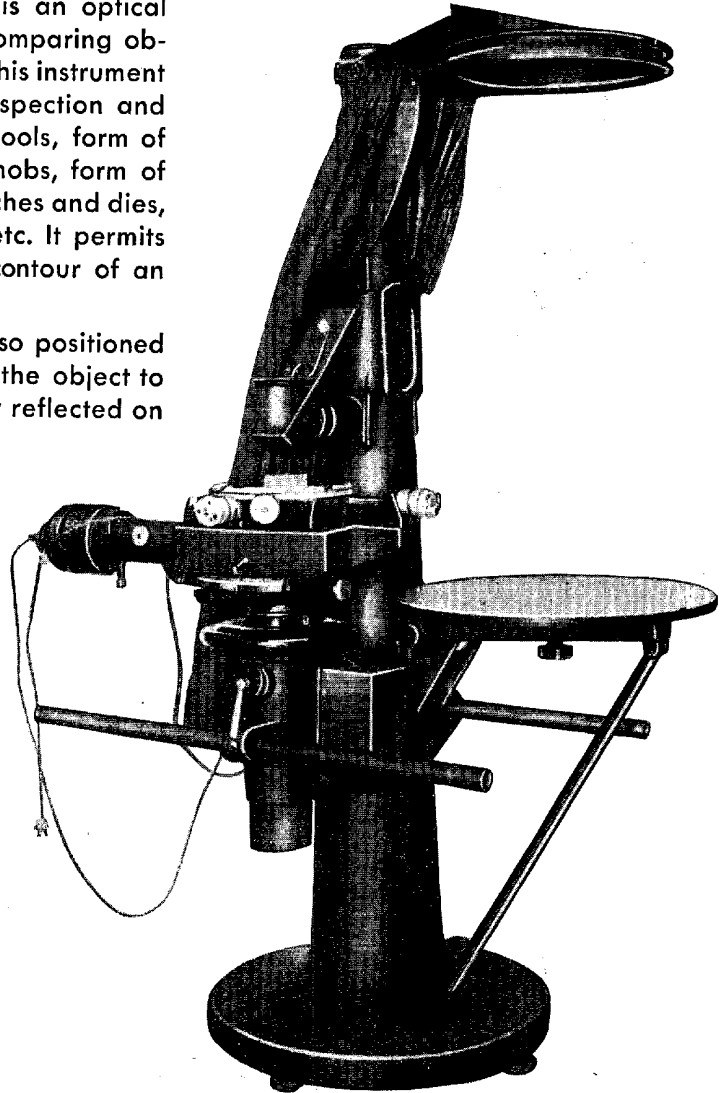
Without experience or special training, any shopman can operate the machine with speed and precision. Its scope of usefulness embraces a large variety of work in production, tool-room, inspection, or laboratory.

Essentially, the Projector consists of a suitable light source, whose beams are directed through a set of condensing lenses, projection lens, which function as a magnifying agent. The magnified image is projected on a properly situated mirror, which directs it onto a conveniently positioned viewing screen.

The stage upon which the specimen is placed is provided with a circular movement with graduated scale and vernier reading to 3'.

The linear movements of the stage slides are controlled by two micrometer screws and have a range of 25 mm in either direction in the horizontal plane. The insertion of gauge blocks increases the longitudinal range to 150 mm and the transverse range to 50 mm.

The instrument may be used for both transmitted and reflected light work.



SPECIFICATIONS

Magnifications of Projector	10x, 20x and 50x
Fields of view (object diameter completely imaged on the screen) mm	60, 30 and 12
Maximum stage travel, mm:	
longitudinal	150
transverse	50
vertical	100
Reading of stage micrometer screws, mm	0.005
Circular stage graduated to 1°, reading to, minutes	3
Stage slides swivel	±20"
Maximum size of work under investigation, mm:	
length	330
diameter	150
Source of illumination	bulb, 100 w. 12 v.
Transformer for reducing A. C. mains (120—220 v.) down to 12 v.	
Overall dimensions, mm	2100x1200x900
Weight of instrument, kg	350

ACCESSORIES

V-blocks	Illumination centering attachment
Centers and centers' support	Mirror protector
object clamp	Gauge block fixing slide
objective 2x	Set of gauge blocks
objective 50x	

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